AUSTRALIAN PLANT DISEASE RECORDER

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For confidential circulation to plant pathologists in Australia - PLEASE DO NOT ABSTRACT.

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PLANT DISEASE NOTES

CEREALS AND GRASSES

HETERODERA MAJOR ON OATS:

Recently the cereal cyst nematode (Heterodera major) was recorded for the first time in W.A. on oats at Beverley. Occasional small patches of plants were unthrifty and had purplish leaves. Examination of the root system revealed a typical picture of short, branching, thickened roots from which cysts of Heterodera major were obtained.

So far the nematode appears to be present in trace amounts only in W.A.. Any information concerning the control of this eelworm, apart from crop rotation using legumes, and its introduction to new areas would be welcomed. It would be particularly interesting to know how it entered W.A.

- OLGA M. GOSS

Department of Agriculture,
PERTH.

SEEDLING MORTALITY IN CEREALS:

A pre-emergence problem, known locally as 'bare patch', has become increasingly prevalent in cereal crops during the last two seasons. It is most noticeable in crops sown after clover ley and is usually confined to small areas, each of a few square feet, scattered throughout a crop. However, on some properties, areas up to a quarter of an acre have been affected by the condition.

Symptoms on the affected seedlings are variable; the coleoptiles of many are rotted away completely, either at or close to the seed; in other instances, the coleoptiles are found to be curled and twisted, and rotting is usually, but not always, associated with such distortions.

The causes of bare patch are obscure at present. However, there is evidence to suggest that a number of organisms are responsible for the rotting and that environmental factors are largely responsible for the distortions of coleoptiles.

A long term experiment has been commenced at Avondale Research Station to evaluate the efficacy of seed protectants for reducing mortality of wheat germinating in either ploughed or scarified clover ley ground. The materials being used are copper carbonate, ceresan, and thiram, each at the rate of 2 oz. per bushel.

Preliminary results suggest :

1. Mortality is lower in ploughed ground, in the case of untreated seed than in scarified ground.

2. The use of a seed protectant has reduced the mortality in scarified ground.

3. Ceresan is the most effective seed protectant in scarified ground, mortality being 25% greater in the untreated plots.

- W.P. CASS SMITH &
S.C. CHAMBERS

Department of Agriculture,
PERTH.

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A long term experiment has been commenced at Waendale Research Station to evaluate the efficacy of seed protectants for reducing mortality of wheat germinating in either ploughed or scarified clover ley ground. The materials being used are copper carbonate, corosem, and thiram, each at the rate of 2 ozs. per bushel.

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3. Corosem is the most effective seed protectant in scarified ground, mortality being 25% greater in the untreated plots.

- W.P. CLODE SMITH
B.Sc. (Agric.)

Department of Agriculture,
PERTH.

TURF DISEASES ON SYDNEY GOLF COURSES:

As reported by the writer (A.P.D.R. 7 : 4 : 41, 1955; 8 : 4 : 57, 1956; 9 : 4 : 32, 1957), the two main diseases on golf greens in Sydney are brown patch (Rhizoctonia solani) and dollar spot (Solerotinia homoeocarpa).

A statistically designed, fungicide-testing experiment was carried out on four Sydney golf courses during the 1957-58 summer.

The grass in all cases was Agrostis tenuis. The incidence of dollar spot was high, in spite of the dry conditions between September and December 1957. Counts of dollar spot lesions ranged from 0 - 2641 per plot.

The incidence of brown patch was low on the experimental greens. Counts of brown patch lesions ranged from 0 - 169 per plot on one of the experimental greens. These varied in diameter from 3 to 30 inches.

The results, assessed on counts of lesions are indicated in the following table. Control was rated on a 0 - 10 basis; 0 indicating complete control of the disease and 10 indicating the poorest control.

Treatment	Application	Rate per 1,000 sq.ft	Dollar Spot control rating
1. Corrosive sublimate + calomel (1 : 1)	3 weekly	3 oz.	3.8
2. Corrosive sublimate	3 weekly	2 oz.	4.6
3. Corrosive sublimate + calomel (1 : 1)	4 weekly	3 oz.	5.0
4. Corrosive sublimate	3 weekly	1½ oz.	9.9

In treatments 1 and 3 the fungicide mixture was applied in 50 gallons of water, after which the green was lightly watered. Treatments 2 and 4 were applied in 10 gallons of water with no subsequent sprinkling.

Counts of brown patch were not high enough to permit a rating for control.

The mercury treatments had a retarding effect on the growth of the grass but no outward sign of injury was apparent.

The additive effect on calomel is clearly shown at the 3 weekly interval but it is apparently not very active during the fourth week. (Compare treatments 1 and 4 with 3).

- D. REILLY

Department of Technical Education,
SYDNEY.

- 10 -

D. RILEY

Department of Zoological Education.
SYDNEY.

FIELD AND FODDER CROPS

OCCURRENCE OF PEPPER SPOT (PSEUDOPLEA TRIFOLII) ON CLOVERS IN VICTORIA:

During the present season, widespread occurrence of a disease, which has been identified as pepper spot caused by Pseudoplea trifolii, has been reported in Victoria.

The species affected have been white clover, red clover, strawberry clover, and subterranean clover, the areas concerned being north-eastern, northern, and Gippsland districts.

The disease has been particularly severe this winter in the Corryong district in north east Victoria, where it has been estimated that growth of white clover has in some instances been reduced by up to 50 percent. The development of numerous, minute, dark spots on the leaflets and petioles precedes the death of the leaf.

It is characteristic of the disease that direct examination of the spots has failed to reveal the presence of any sporulation, but the fungus is readily isolated in culture, where perithecia containing hyaline muriform ascospores are produced.

- C.R. MILLIKAN

Department of Agriculture,
MELBOURNE.

SUBTERRANEAN CLOVER STUNT:

Clover stunt virus disease has been found this season in subterranean clover pastures in the south coast agricultural areas at Esperance, Gibson, and Gairdner River.

The incidence varied from less than 1% to 90% but in most paddocks about 2% of plants were affected. The disease occurred most commonly in the variety Bacchus Marsh and to a lesser extent in Dwalganup and Yarloop.

Glasshouse transmissions to Bacchus Marsh were readily effected with black aphids (as yet unidentified) found feeding on diseased plants in the field.

- H. L. HARVEY

Department of Agriculture,
PERTH.

ROOT CANKER OF LUCERNE:

During the summer of 1957 a disease of lucerne, not previously recorded in South Australia, was present in an irrigated pasture at Swan Reach on the River Murray. The lucerne was affected in irregular but well-defined patches, varying from a few feet to several yards in diameter, in which the plants were severely wilted or dead. On the tap roots and major side roots of affected plants there were many black, sunken lesions, which, in some cases, completely girdled the roots. The size of the lesions varied from about 1 mm to 1 cm in diameter and in every case the lesions occurred where a small side branch joined a main root.

Pellicularia praticola and Fusarium solani were isolated consistently from the lesions and inoculation tests on well established lucernegrowing in pots showed that P. praticola was the causal organism.

The disease is identical with Root Canker of lucerne described by O.F. Smith in Phytopathology, 33, 1081, 1943. It is a high temperature disease and is likely to cause damage only during the summer.

- A. KERR

Waite Institute,
ADELAIDE.

WHITE MOULD OF AIR-CURED TOBACCO:

During the abnormally wet June weather this year, air-dried leaves of Burley tobacco were found to be severely attacked by a white mould. The fungus isolated from the leaf was identified as Botryosporium pulchrum Cda., which has been reported damaging air-dried tobacco overseas.

Pathogenicity was tested by inoculating leaves with a spore suspension of the fungus.

1. On flue-cured tobacco varieties using lemon leaf, variety Hicks, and nondescript cutters, variety Virginia Gold.

After 10 days in a moist chamber no rotting of the leaves had taken place. Apparently this type of tobacco is not susceptible to B. pulchrum.

2. On air dried leaves of Burley.

After 3 days in a moist chamber considerable damage had been caused to the leaves of the air-dried Burley, with B. pulchrum sporing abundantly on the surface.

The abnormal June weather no doubt contributed to the severity of the attack.

- BARBARA L. WINKS

Department of Agriculture and Stock,
BRISBANE.

BARN ROT OF TOBACCO:

Barn rot (Rhizopus arrhizus Fischer) of tobacco has been prevalent in some barns in South Queensland this year. As the disease was appearing both before and after curing an investigation was conducted to ascertain if the fungus survived the high temperatures reached in the curing barns.

The optimum temperature for growth of the fungus was found to lie between 32° and 36°C. Slight growth occurred at 42°C and negligible growth at 45°C. The fungus spored freely at 38°C but no sporulation occurred at 40°C.

The viability of the fungus following exposure to temperatures between 70°C to 82° C, the temperatures reached in the curing process, was tested in a hot air oven. Three procedures were used:

(1) Infected tobacco leaf tissue was placed in petri dishes.

(2) Cultures of the fungus were grown on PDA in Mc Cartney bottles.

(3) A spore suspension was placed in hanging drops in Van Tieghem cells over water in Petri dishes.

After 30 hours within the above temperature range the preparations were removed and isolations made from each onto PDA plates. No fungal growth occurred.

It can therefore be concluded that R. arrhizus does not survive the high temperatures of the curing operations and that re-infection of the leaf must take place after removal from the barns.

- BARBARA L. WINKS

Department of Agriculture and Stock,
BRISBANE.

CORRELATION BETWEEN LEAF AND STEM INFECTION OF TOBACCO BY PERONOSPORA TABACINA ADAM:

Stem infection of tobacco plants by *P. tabacina* usually occurs in two ways:

(a) The disease can be brought into the field with stem infected transplants. This occurs chiefly when seedbeds are kept dry and too little benzol is applied (Angell, 1957). Under these conditions lower leaves and cotyledons of plants can become infected and the pathogen penetrates from them into the stem tissues. If the plant is not killed the infected area may remain unnoticed at transplanting and when favourable conditions for disease development appear the pathogen resumes growth and spreads through the stem tissues.

(b) During epiphytotics, in the field, the pathogen may spread from the leaf through the vascular system of the petiole into health stem tissues.

Results obtained from our glasshouse and field experiments in Canberra indicate that necrosis in stems is directly related to severity of leaf symptoms. Thus in a shaded plot, where foliage infection in plants was severe, stem necrosis extended from the base to the top of the plant, usually affecting all tissues. In an adjacent open plot with later and milder foliage infection, stems of the plants were moderately affected, the pathogen being associated only with external vascular system, internal phloem and pith remaining healthy. A characyeristic feature of such plants is a necrotic discolouration clearly visible in the outer layers of the woody conducting tissue and slightly in the inner layer of the bark. On a third plot about $\frac{1}{4}$ of a mile distant, infection of leaves was only slight and stem infection did not occur.

Full details of development of stem infection and the distribution of the pathogen in the plant tissues will be described elsewhere.

- M. MANDRYK.

C.S.I.R.O.,
Division of Plant Industry,
CANBERRA.

VEGETABLES

SPRAYING FOR CONTROL OF LEAF SPOT OF CELERY:

During the past autumn, testing of cover sprays for the control of Septoria apii was commenced on the property in the market gardens adjacent to Perth.

The trial consisted of a randomized system of plots, each measuring 25 links in length by 2 rows in width, and was designed so as to incorporate 4 replications of 9 treatments. The fungicides tested as cover sprays were :- Bordeaux 4:4:40; Phygon 1 lb/100 gals; Thiram 1½ lb/100 gals; Zineb 1½ lb/100 gals; Ziram 1½ lb/100 gals; Vancide 2 lb/100 gals; Ferbam 2 lb/100 gals; Captan 2 lb/100 gals.

Spraying was commenced on the 10th April 1958 and continued at 10-14 day intervals until the 19th July, 1958.

An assessment of leaf spot incidence in relation to treatment was made on the 24th July, 1958. In order to do this, randomized samples of 100 leaves from each plot were examined and a numerical value was allotted to the condition of each leaf in accordance with Table I.

TABLE I - Classification of leaf spot symptoms on individual leaves

Class	Symptoms on leaf	Numerical evaluation
1.	No visible symptoms	0
2.	Less than 4 lesions per leaflet	1
3.	More than 4 lesions per leaflet	2
4.	Partial or complete collapse of 1 leaflet	3
5.	Partial or complete collapse of more than 1 leaflet	4

The mean leaf value obtained for each plot was transformer to an $\sqrt{x}$ value during the analysis of results. The final analysis of leaf spot incidence in relation to treatment is contained in Table II.

TABLE II - Effect of various cover sprays on the incidence of leaf spot

Fungicide	Evaluation of leaf spot incidence
Bordeaux	0.23
Phygon	0.29
Ziram	0.39
Zineb	0.51
Captan	0.55
Thiram	0.58
Vancide	0.79
Ferbam	0.85
Control (no fungicide)	1.58
Difference for significance	
5% level	0.16
1% level	0.22

During the examination of plots on the 24th July, it was noted that the plants sprayed with Phygon appeared to be retarded in growth and a paler green than normal.

- S.C. CHAMBERS

Department of Agriculture,
PERTH.

RHUBARB RUST:

An outbreak of rust on rhubarb occurred at Mt. Tamborine in south-east Queensland in 1957. Specimens collected in August 1957 which bore both urediospores and teliospores were sent to the Commonwealth Mycological Institute, Kew. Mr. Deighton of the C.M.I. has reported that this was the first teliospore material of rhubarb rust that they had received. After examination of the type of Puccinia rhei-undulati Hirats. f., he assigned the Queensland specimen to that species although teliospores of the latter are slightly less thickened at the apex and slightly more constricted at the septum than are those in the type specimen. Mr. Deighton also reports that uredial material of the rhubarb rust from N.S.W. and New Zealand is identical with Queensland material.

- R.F. LANGDON

Department of Botany,
University of Queensland,
BRISBANE.

NOTES ON THE OCCURRENCE OF DIDYMELLA LYCOPERSICI KLEB. IN TASMANIA:

A previous report recorded the occurrence of Didymella lycopersici in Tasmania. (A.P.D.R. Vol. 9, No. 4). Further work on the outbreak has been carried out.

Diseased fruit and plants of tomato were collected during the early months of 1958 from the property on which Didymella lycopersici had been recorded. Isolates were made and pycnidia-forming types and vegetative, septate types were inoculated into the stems of tomato plants. A pycnidia-forming type isolated from tomato fruit 120 miles from the property was identified as Phoma destructiva using the currently accepted taxonomic characters and disease symptoms (Walker, J.C., Diseases of Vegetable Crops. McGraw Hill, 1952) and was included in the inoculation tests for comparison.

While several isolates were non-pathogenic, Phoma destructiva and four isolates produced a sunken girdling stem lesion. None were capable of killing the host, new shoots being repeatedly produced from nodes below the lesion.

It is possible that the original isolate, identified from the imperfect stage as Didymella lycopersici, was not collected during the 1958 season, suggesting that the fungus was not highly pathogenic during this period.

If one of the isolates was Didymella lycopersici, it did not possess the highly pathogenic characteristics observed in Europe.

The ability to differentiate Phoma spp. and the imperfect stage of Didymella lycopersici has not been shown to be conclusive by workers in this field. It seems likely that the Didymella reported last year may, in fact merely have been a particularly active form of Phoma destructiva.

The investigation is continuing.

- P.J. SAMPSON.

Department of Agriculture,
HOBART.

FRUIT

STRAWBERRY VEINBANDING VIRUS:

The suspected presence of strawberry veinbanding virus in Victoria (A.P.D.R.10, 1 : 11-12) has been confirmed by aphid transference of the virus to Fragaria vesca var. Alpine seedlings.

The virus was isolated from heat-treated Ettersburg 89 and Tardive de Leopold from which strawberry mottle viruses had been eliminated.

The earlier report that the virus was not present in the Tardive de Leopold variety was incorrect, as it has since been isolated from that variety. However, it has not yet been isolated from the Melba variety, probably because the writer's stock came from an isolated plot in north-western Victoria.

The veinbanding virus was transmitted with similar efficiency by Victorian and Queensland strains of the strawberry aphid. A second virus - possibly the strawberry crinkle virus - was not transmitted. Its absence was detected by a reduction in severity of symptoms in aphid inoculated plants, as compared with those inoculated by leaf grafting.

Symptoms induced by the veinbanding virus isolates were identical with those described and illustrated by Frazier (Phytopathology 45:307-312).

In transmission experiments conducted to date, aphids have remained infective for a maximum period of 7 hours of hourly serial transfers, after an acquisition feeding period of 21 hours. Mottle (or virus) types do not persist for more than 2-3 hours in the vector.

The apparently high incidence of veinbanding virus and the universal occurrence of strawberry mottle viruses in older varieties, together with the common occurrence of strawberry crinkle cirus, would explain the dominance of severe crinkle symptoms in commercial plantings in Victoria.

In North America, strawberry veinbanding and strawberry latent viruses induce crinkle symptoms on the Marshall variety. In Victoria, strawberry mottle and strawberry

crinkle viruses induce severe crinkle symptoms on sensitive varieties such as Melba, Royal Sovereign, and Tardive de Leopold. It is not known whether strawberry latent virus is associated with the crinkle complex, as either veinbanding or cinkle viruses have survived in all stocks of old varieties which have been heat-treated. The presence of a latent virus infection can only be demonstrated in the absence of other viruses.

- L. L. STUBBS

Department of Agriculture,
MELBOURNE.

MISCELLANEOUS

RUST ON A FERN:

Two collections of rust on *Davallia pyxidata* have been made in Queensland. One is from the Eungella Ra. near Mackay, the other from Cunningham's Gap, west of Brisbane. Dr. G.B. Cummins of Purdue University, U.S.A., has recently identified them as *Milesina odontosoriae* Hirat. f.

- R.F. LANGDON

Department of Botany,
University of Queensland,
BRISBANE.

ARMILLARIA MELLEA ON EUCALYPTUS SPP.:

In some of the forests of the central highlands of Victoria, Armillaria mellea is causing a considerable amount of damage to Eucalyptus spp.. The species affected are E.obliqua, E. radiata, and E.rubida, in the Daylesford and Trentham districts, and E.obliqua, E.bicostata, and E. viminalis, in the Mt. Cole forest north of Beaufort. As far as is known at present, the areas of infection lie in the 2500-3500 feet altitude range with average annual rainfall figures of 40 inches or more. Dead or infected trees may be found singly or in patches of up to 2 acres throughout thousands of acres of forest country.

The bark at the butt of badly infected trees is typically heavily impregnated with white mycelium and on the surface of the sap-wood the mycelium spreads in small fan-shaped patterns. Black shoe-string-type rhizomorphs have not been found under the bark or around the butts and only a few small ones have been seen on the surface of roots. However a feature of isolations of the fungus made from Eucalypt material is the conspicuous rhizomorph formation on malt-agar medium.

- HELEN M. PURNELL

Forests Commission of Victoria.
MELBOURNE.

NEMATODE GALLS OF CAPE WEED:

Over the past three years, gall formation on the leaves and stems of Cape Weed (Cryptostemma calendulaceum) has been observed in the grounds of the Waite Institute in late winter-early spring. Each year the galls have been found from August till early October.

In the centre of each gall, in a gall cavity, up to three mature specimens of both male and female nematodes of a species of Anguina have been found. Associated with the mature specimens have been found hundreds of larvae and eggs. Several species of Anguina which produce galls in both the vegetative and reproductive tissues of plants are known. In this case the galls are confined to the vegetative parts of the plant.

The galls form in the cortical tissues surrounding the vascular system of the plant, particularly on the stems and midribs of leaves. Small galls have been found in the reticulate veins of the leaves.

In shape, the galls vary from small semi-circular appendages to large bulbous outgrowths attached to the stems and petioles. Large galls may assume a reddish colouring due to pigmentation of the host tissues, but generally they have the same colour as the normal host tissue. The galling of the tissues causes severe distortion of the leaves and stems. In heavily galled plants, (plants having 100 or more discrete galls) reduction of growth is quite marked.

- J. FISHER

Waite Institute,
ADELAIDE.

DIAGNOSTIC ANTISERA FOR PLANT PATHOGENS:

One of the Resolutions of the 1955 Plant Diseases Conference contained a recommendation that steps be taken to develop in Australia a collection of bacterial and viral antisera to assist in the rapid diagnosis of plant pathogens. Unfortunately no progress has been made in setting up officially such a collection. It will be of interest, however, to plant pathologists, to know that Dr. Rose Mushin, Senior Lecturer in Bacteriology, Bacteriology Department, University of Melbourne, has during the past few years been building up a private collection of antisera against bacterial plant pathogens and Dr. Mushin has agreed to my request that we publicise her collection in the A.P.D.R. Her collection includes somatic antisera against the following:-

Agrobacterium tumefaciens
Corynebacterium flaccumfaciens
C. michiganense
Erwinia aroideae
E. atroseptica (2 strains)
E. carotovora (2 strains)
Pseudomonas barkeri
Ps. medicaginis (2 strains)
Ps. syringae (3 strains)
Ps. pisi (2 strains)
Ps. solanacearum
Xanthomonas campestris
X. carotae
X. juglandis
X. phaseoli

- C.J. MAGEE

Department of Agriculture,
SYDNEY.